Journal of Forensic and Legal Medicine 20 (2013) 650

Contents lists available at SciVerse ScienceDirect

Journal of Forensic and Legal Medicine

journal homepage: www.elsevier.com/locate/jflm

Letter to the Editor

# Armanni–Ebstein lesions and renal epithelial cell basal subnuclear vacuolations are not the same entity

*Sir,*

We read with interest the recent paper by Kodikara et al.[1] on the usefulness of certain morphological changes in renal tubular epithelial cells as a diagnostic marker for possible diabetic ketoacidosis, and agree that such changes may be the only indication of significant metabolic disturbances at autopsy. However, although the authors cite Ebstein's paper from 1882 as indicating that Armanni–Ebstein lesions are "subnuclear vacuolations of the renal tubular cells which contain fat" this warrants closer examination. Although we once also used this terminology,[2] we have had occasion recently to review the original papers by Armanni and Ebstein where the descriptions were instead of swollen, rounded and transparent cells, with small dark peripherally-displaced nuclei,[3–5] characterised by virtually total conversion of the cytoplasm into a single large vacuole.[6] Numerous autopsy studies and animal models have confirmed the Armanni–Ebstein vacuoles as accumulation of cytoplasmic glycogen directly related to hyperglycemia,[6–11] rather than the discrete subnuclear vacuolations that contain fat, depicted in Figure 1 of Kodikara et al.'s paper[1] – the latter unrelated to glucose levels.[12] While there is no doubt that the two phenonema can co-exist in conditions such as diabetic ketoacidosis, we would suggest that the originally described Armanni Ebstein lesions refer to a clear-cell glycogen nephrosis associated with hyperglycaemia, and that basal/subnuclear lipid vacuolisations are associated with ketoacidosis from a variety of causes, including diabetes, alcoholism and starvation.[13,14] We have also recently noted that formalin pigment deposition around basal vacuoles may be another useful histologic marker suggesting ketoacidosis, particularly in cases where cellular morphology has been compromised by decomposition.[15] Is there a need to clarify the definitions of the above lesions? Academically it may assist in elucidating better underlying biochemical processes associated with each morphological change, and practically it may be of help in focussing more on possible metabolic derangements and conditions at autopsy that are specific for each entity.

*Conflict of interest*

None declared.

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1 March 2013
Available online 19 April 2013


http://dx.doi.org/10.1016/j.jflm.2013.03.020